Evaluating the Relative Effect of Priming and Goal Setting on Performance In Comparison to Effects of Dispositions on Performance.

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Abstract

Previous research has suggested that it is possible to increase performance on workplace tasks by presenting achievement-oriented stimuli and setting challenging goals prior to the commencement of the task. A sample of 100 mainly undergraduate students took part in an experiment testing a combination of priming and conscious goal setting on a proof-reading task. Participants were randomly assigned to one of four groups: achievement priming and a difficult goal; achievement priming and the instruction to 'do your best'; no priming and a difficult goal; and no priming and the instruction to 'do your best'. A narrow-trait personality measure was also presented to identify whether certain individuals performed at a higher level than others. The results indicated that the setting of a difficult goal prior to completion of the task was an effective aid to performance. When both a difficult goal and achievement priming are given to participants they perform better than those in the other groups. Participants with a disposition to enjoy intellectual activities, such as reading widely and to a lesser extent, participants who believe in their ability to succeed performed better on the proof-reading task. High achievement-oriented participants perform better than others in the group given no additional motivation. Implications of these findings are discussed.

Evaluating the Relative Effect of Priming and Goal Setting on Performance In Comparison to Effects of Dispositions on Performance.

Many managers of companies state that their greatest asset is their staff. Staff are not as useful if they are under-performing. It is therefore no surprise that companies pour large amounts of money into finding out how to maximise the utility of their employees. They do this in the hope that the payoffs will be in dollars. With the multi-national nature of many industries, competition is hotter than it has ever been. Even a slight increase in performance across employees in a large company can lead to profit increases. This may give one company a competitive advantage over its rivals. High performance also has positive associations with other workplace attitudes, such as job satisfaction (Judge, Thoresen, Bono & Patton, 2001). When employees know they are performing well, they are generally happier. In turn, high satisfaction with one's work leads to higher organisational commitment and lower counterproductivity. Employees will want to stay with the company longer, thus reducing turnover (Latham, 2007). This reduces costs for companies, which is essential to their growth in terms of profits.

Research in I/O Psychology has lead to a large number of influential papers being published on ways to enhance job performance. John Campbell's (1990) model of task performance outlined three key components which determine performance on a task. These are declarative knowledge, procedural knowledge and skill, and motivation. The model is a starting point for organisations making important decisions in hiring, training, monitoring and reviewing the performance of employees. This project is split into two parts and focuses mostly on improving our understanding of task motivation in order to maximise performance. More specifically, performance goal setting methods will be looked at in conjunction with priming as a method for motivating individuals to perform. The second

part of the project will look at a small number of individual difference variables associated with goal pursuit and task performance.

Figuring out how to maximise motivation has been the major goal of motivation theorists and researchers, since a highly motivated individual will display high performance, providing they also have the knowledge and skill to do the work. One of the most effective strategies to increase motivation is using goal setting initiatives. Traditionally, this has been through assigning challenging, yet achievable goals to employees (Locke & Latham, 1990). Recently, some researchers have suggested that combining cognitive priming techniques with goal setting can augment performance further (Stajkovic, Locke & Blair, 2006). Favoured priming techniques include having participants complete word search or sentence unscrambling tasks. While results of the initial research have been promising, the experiment needs to be replicated in a more realistic task setting. The aim of this project is to look at a specific task used in the workplace (proof-reading/ document checking) to see if the above methods have an effect on performance. Below, previous studies and experiments carried out on goal setting and priming will be outlined, along with their findings. Prior to this there is a brief review of the literature on goal setting and priming.

Goal setting and task performance

A theory of goal setting in task performance was established by Locke and Latham (1990), in a book with the same title. A key aspect of this theory is that a difficult, yet attainable goal to strive for increases the performance of an individual on the task. Locke, Shaw, Saari and Latham (1981) found that goals have the effect of creating choice to motivate, encouraging energy expenditure or effort, helping this effort to continue over time (persistence), and motivating the development of strategies for goal attainment.

Another key point is the environment in which the goal or target is presented. Locke and Latham (1990) point this out as critical when studying the effects of goals in applied settings. For example, the offering of incentives such as pay rises, promotions and fringe benefits for high performance will drive more employees to achieve workplace goals or targets. Individual differences must also be factored in to the performance – goal relationship. If the workplace supports high performance with incentives such as 'employee of the month' some employees will attempt to achieve this award whereas others may see it as a waste of time and work to a lower standard. There are more effective strategies to encourage a large proportion of employees than the one just mentioned. The significantly large effect of goals on behaviour gives the field plenty of pathways for research. Some topics focused on more recently include: looking at whether the individual or the organisation should set goals; the level a difficult goal should be set at; the importance of offering rewards for goal attainment; and the effectiveness of short versus long-term goals.

Many of the principles of goal setting theory need to be taken into account. The experiment carried out in this paper applies some of these principles. A concern of organisations has been what type of goals or targets employees should be set. The answer to this is somewhat context dependent and does not apply to every employee. In general, setting difficult goals is the most effective way to get employees to produce close to maximum output. According to Locke and Latham (1990) a goal is classed as difficult when only ten per cent of people can reach it. The same authors reviewed 192 studies on goal difficulty. In 91 per cent of these studies, higher performance was recorded among those set difficult goals. Furthermore, they found that more specific difficult goals lead to better performance than vague 'do your best' goals, 92 per cent of the time. This was based on 206 separate studies. The number of cases where difficult goals are best is impressive.

One would expect that other variables such as pay and work conditions would impact negatively on the goal – performance relationship in more than ten per cent of cases.

There is no doubt that the act of setting goals or targets for employees to work towards is effective. However, this is not the only way people can be motivated to perform at a high level. In some cases it may be necessary to offer inducements, such as pay rises and promotions, in order to motivate employees to achieve their goals. This is known as extrinsic motivation (Bandura, 1986). When a reward for achievement is offered, people are encouraged to make their target to get the pleasure the reward provides. If the task is too challenging or the reward is not worth the effort, then it will not improve performance (Bandura, 1997). In many cases it is not feasible to offer such rewards, nor should it be necessary. Therefore, organisations may need to consider other ways to increase the performance of their staff.

Priming and task performance

People can be automatically directed towards higher performance. The term automatic goal pursuit has been used to describe goal-directed behaviour without explicitly stating the goal. This comes from the auto-motive model, devised by Bargh (1990). The model suggests that indirect cues about a particular thing can be presented without conscious awareness. Underlying cognitive processes work on these cues, leading to automatic behaviour. In the context of goal-directed behaviour, indirect cues would be related to performance and achievement. This is analogous to instinct or expertise. Experts in any field are capable of taking shortcuts without even knowing they are doing it. For example, tennis players are able to take cues, such as the angle of their opponent's racket and the speed of the ball, to start getting in to place to hit the next shot (Gollwitzer & Bargh, 1996).

Priming is the technique commonly used in Psychology to get people to act without their conscious awareness. When a person is primed with a stimulus their performance on a task can be enhanced. This method of conditioning people to be responsive to a particular stimulus was devised by cognitive psychologists. They found that people could be lead to act in certain ways without being able to consciously account for such actions. Priming techniques usually involve the presentation of words or images which are associated with each other, where participants are unaware of the association. Meyer and Schvaneveldt (1971) found that people were quicker to judge whether both words in a pair were real English words when the two were related. For example, when presented with the words *bread* and *butter*, people established these were both words faster than when the words were unrelated, such as *nurse* and *apple*. Although this example is unrelated to performance on tasks it shows exactly how priming works. The language area in the brain forms neural connections between words which are associated. When a word is presented, the brain automatically starts processing words associated with it (Quillian, 1966). It is an automatic process and one which is useful when things need to be done quickly. Priming is not just limited to the laboratory. There are important uses for it in the real world.

The preferred priming method in performance tasks is to have participants carry out a task where they are either searching for words or unscrambling sentences (Srull and Wyer, 1979; Bargh, 1990). For example, participants complete a word search, such as the ones found in puzzle books. Amongst these words will be words which have an association. In the case of looking at goal setting and performance, these words will be achievement-oriented (e.g. succeed, attain, achieve). This method has been used by Bargh and his colleagues (e.g. Bargh et al., 2001). The other method, devised by Srull and Wyer (1979), involves participants unscrambling sets of words to form grammatically correct sentences. In the process of doing this, they will read over each word several times, to see how it can

be made into a sentence with the other words present. If a number of these words are associated with achievement, they might be held internally by the brain. It is possible that the words will motivate people to do better in certain tasks without being aware of having seen a pattern.

Linking priming, goal setting and task performance

The experiment conducted by Srull and Wyer (1979) involved priming participants with words related to either hostility or kindness. This was designed to show that impressions that people form can be influenced by unconscious processes, such as priming. Participants were given either 60 or 30 sets of words to unscramble. Each set included four words, three of which could be unscrambled to form a complete sentence. Furthermore, participants were assigned to a group where either 80 or 20 per cent of the sets had a word associated with hostility or kindness. At no stage were participants made aware that the task was being used to prime them for the next part of the experiment. They were then asked to read a passage about a person. Following this, they were told to rate on a scale of 1-10 how hostile or kind they thought the person was. The results revealed a significant effect for priming. Those given priming words in 80 per cent of the sets rated the person as higher on the trait than those given priming words in only 20 per cent of the sets, regardless of whether they had 60 or 30 sets. Those given 60 sets rated the person as higher on the trait than those given just 30 sets. Therefore, the greatest effect was the percentage of sets containing a priming word. The results of this experiment suggest that trait judgements can be influenced by unconscious means such as priming.

Following the results of this paper, there has been strong support for the use of this type of priming. Much of the research has been undertaken by John Bargh and his colleagues (e.g. Bargh & Thein, 1985; Bargh & Barndollar, 1996). Chartrand and Bargh

(1996) carried out two experiments providing further support for the above findings but they aimed to create priming effects for impressions or memories of the traits of a person. The first experiment separated the participants into either a memory or impression group. They were given the sentence unscrambling technique but this time five words were presented, requiring participants to form sentences using four of the words. There were 15 sets of words. Of these, 13 sets contained a word associated with either memory (e.g. *recall, remember, retain*) or impression formation (*assess, personality, opinion*). They were then instructed to perform a recall task on things associated with remembering characteristics of a person. Those given the impression words in the priming task had better recall. This replicated findings of an experiment by Hamilton, Katz and Leirer (1980), whose participants were explicitly told to either memorise or form an impression of characteristics of a person. It must be noted that, at no stage in the Chartrand and Bargh (1996) experiment, were participants given any such instructions. Their recall was enhanced solely by the priming. The second experiment compared a group given the priming task related to impression formation with a control group given totally unrelated words. The group given the impression formation priming performed better on the recall task. This provided further evidence of the strength of the priming effect. Another important factor in both experiments was that none of the participants could identify that they were being primed, let alone what the common theme of the priming task was. This finding proves that the actions are controlled by unconscious processes.

A series of experiments carried out by Bargh, Gollwitzer, Lee-Chai, Barndollar and Trötschel (2001) aimed to show that priming can be useful in many settings. The focus was on the pursuit of behavioural goals. This is more applicable to the realm of human performance. As was discussed earlier, setting goals in the workplace can lead to a higher level of performance by the individual. What Bargh et al. (2001) wanted to show is that

people can be aided in their performance without being set a conscious goal. Instead of using the scrambled-sentence technique, a word-find was designed to create a priming effect. A 10 x 10 matrix of letters was put together with 13 words hidden in it. For half of the participants, seven words were associated with achievement (e.g. *attain, succeed, master*). The other six words were achievement neutral (e.g. *stone, lamp, green*). For the other half of participants, all 13 words were achievement neutral. This was the control group. The experimental task also involved searching for words in a matrix. Participants were allowed ten minutes to identify as many words as possible. Those given the achievement priming found more words on average than the control group. The other experiments found support for a priming effect on a cooperation task, a dissociation task, a persistence task, and a task where participants were primed to resume interrupted goals. As with Chartrand and Bargh's (1996) experiments, participants were unaware that priming had occurred. They were, of course, fully debriefed on the priming after the experiment.

The usefulness of setting goals in the workplace and the effectiveness of priming has been discussed. An experiment by Stajkovic, Locke and Blair (2006) attempted to link the two together. Their aim was to see if combining a priming task with an experimental task where participants were set a target or goal, would lead to higher performance than priming or setting the goal alone. A sample of 96 university students were the participants. The first manipulation was a priming task. A scrambled sentence task was used. Participants received either the achievement-oriented word sets (where 12 out of 20 sets contained an achievement-oriented word) or the achievement-neutral word sets. Half the participants were randomly assigned to either of these groups. The experimental task involved naming uses for a wire coat-hanger. For this, participants were randomly assigned to one of three groups. They were either instructed to name at least four uses (*easy goal*), 'do your best', or name at least twelve uses (*difficult goal*). Therefore, over the two conditions there were six

groups of 16 participants. Based on the findings of previous experiments (e.g. Srull & Wyer 1979; Chartrand & Bargh, 1996), it was expected that participants given the achievement priming would perform better on naming uses for the wire coat-hanger than those given no priming. They also expected to see those assigned the difficult goal to perform better than those assigned the easy goal. Finally, they predicted that combining priming with a difficult goal would lead to higher performance than priming or the difficult goal alone. It is important to note that a 24 hour follow up was carried out on each participant. This was used to see if the priming effects, if significant, held over time.

The results of the experiment confirmed their hypotheses. Participants who received the priming task performed better than those who did not. A main effect was also found for goals. Post-hoc analyses confirmed that the difficult goal group and 'do your best' group recalled significantly more uses than the easy goal group but did not differ significantly from each other. Most importantly, a significant interaction effect was found between priming and goals. Post-hoc analyses confirmed that priming enhanced the effect of difficult and 'do your best' goals but not easy goals. The results of the follow up experiment showed that the effects of priming and goal setting held over a 24 hour period. In their discussion, the authors stated that it is not possible to develop a theory of the effects of priming and goal setting on task performance from their findings, as this was the first experiment of its kind. They also refused to claim that their findings could be applied in the workplace, instead choosing to discuss what might come out of future research.

The findings of Stajkovic et al. (2006) appear to be very strong, especially considering this was a pioneering experiment. However, there are a couple of points which need to be highlighted. The first is that the sample size was small, giving the experiment low statistical power. Some of the findings (e.g. the main effect of priming and the interaction effect) only just reached significance at the .05 cut-off. If the experiment was replicated,

the results may fail to reach significance. No significant difference was found between those assigned the difficult goal and those instructed to 'do your best'. Their hypothesis did not expect to find any difference between these groups but maybe it should have. Recall the meta-analytic review by Locke and Latham (1990), who showed that difficult goals lead to higher performance than 'do your best' goals. As Locke is an author of both of these papers it is surprising that no such prediction was made.

This experiment aimed to see whether the Stajkovic et al. (2006) experiment could be replicated using a student sample with a task more closely related to the workplace. The problem with the initial experiment is that the task was to name uses for a wire coat-hanger. Although this is a commonly used method in goal-theory it is not likely to be of much use to organisations. In effect, what Stajkovic et al. (2006) found only has relevance to research. At no stage in their research is any claim made that their findings are transferable to the workplace. This experiment attempted to rectify this to a degree. A student sample was used and the university acted as the workplace. Therefore, the task needed to have some applicability to the work a typical student does. For any real utility, the task also required some applicability to a real workplace. The process of working out what to use was not easy, given that no previous research had looked into it. A proof-reading task was eventually settled on. This is something students get lots of practise at doing and is also a necessary part of many office jobs that require writing.

The objective was to find out if participants given a priming task to begin with would perform better than those not given a priming task. The second part was to see if those assigned a difficult goal would perform better than those instructed to "do your best". Half of all the participants received the priming and half received the difficult goal. One quarter of participants received both manipulations, one quarter priming only, one quarter difficult goal only and the last quarter were assigned no manipulations. The aim was to see whether

combining both manipulations leads to better performance than simply one or the other. It was hypothesised that participants receiving both manipulations will do significantly better than the other three groups. It was also expected that main effects for priming and the difficult goal will exist.

H1: Participants given the achievement-oriented priming task will circle more spelling errors on average in the experimental proof-reading task than participants given the achievement neutral priming task.

H2: Participants given the difficult goal will circle more spelling errors on average than participants instructed to "do your best".

H3: Participants given both priming and difficult goal conditions will circle more spelling errors on average than participants given priming only or difficult goal only. In turn, these two groups should circle more spelling errors on average than participants given no priming and instructed to "do your best".

H4: An interaction will exist between the priming and goal conditions. This should be the result of the first three hypotheses being supported.

Relationship between personality and task performance

The second part of this experiment looked at the way in which personality traits relate to task performance. This has become particularly important in I/O Psychology. Traits are stable features of a person which lead them to behave in certain ways. Hogan (2004) argues traits need to be looked at in the context of the workplace because an employee's action is

explainable in terms of them. There are an infinite number of situations where the action taken by the employee is affected by their personality. However, some situations are more conducive to behaviour due to personality than others (Snyder & Ickes, 1985). For example a new employee is more likely to act in a conservative manner when they are unsure of what to do. Situations such as this are classed as 'strong' situations. In the above case, situational constraints determine behaviour to a greater extent than the employee's personality. Situations where traits are more easily expressed are known as 'weak' situations. Tett and Burnett (2003) proposed a number of different cues controlling the extent to which a person is able to act in line with their personality. They outlined the importance of studying the situation before making trait judgements. They also explained that a vast majority of workplace situations are weak. This underlines how important it is to study traits in a workplace context.

Years of research have found relationships between personality variables and performance. Many of these studies have relied on the Big-Five (Goldberg, 1990) or Five Factor model (Costa & McCrae, 1992). There are a number of other variations on this but the five key domains of personality are the most widely accepted. The five domains comprise of openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. How much of each trait a person has is usually measured through self report scales. Research on the link to performance has found that conscientious employees display high performance across a broad range of occupations (Barrick & Mount, 1991). High levels of the other four traits can lead to high or low performance, although this is more context specific. For example, an extravert is likely to thrive in a door-to-door sales position but struggle in a laboratory research position. The administration of personality tests to job incumbents is often used to determine which traits are most important to success. This has resulted in a proliferation of personality tests in personnel selection. The

widespread use of such tests is a little concerning. Even though personality can predict job performance it is not nearly as good a predictor as general mental ability (Schmidt & Hunter, 1998). This meta-analysis found the average correlation between GMA and performance to be .51, compared with .31 between conscientiousness tests and performance. Yet, according to Barrick and Mount (2005) personality is often given more weight in the selection process than GMA. This does not mean personality should be ignored, it is just important to keep in mind its effectiveness.

More recently, research on personality and performance has been concerned with traits measuring aspects of the original big five. Scales such as the NEO-PI-R (Costa & McCrae, 1992) have sub-scales, known as facets. The NEO-PI-R contains six facets for each of the five factors (30 in total). The facet level is important because it can provide more specific information about the relationship between traits and performance. Roberts, Chernyshenko, Stark and Goldberg (2005) found that the facets of conscientiousness provided incremental validity beyond the general factor of conscientiousness on a number of workplace behaviours. Moreover, important relationships can be masked when only the factor level traits are looked at. For example, work dedication correlates positively with conscientiousness but different relationships exist at the facet level. It correlates positively with industriousness and self-control but negatively with order (Roberts et al, 2005). Based on the results of these studies and others (e.g. Paunonen, Haddock, Fosterling & Keinonen, 2003; Ashton, 1998), narrow traits appear to be useful predictors of performance.

This project used the facet level of the NEO-PI-R (using the international personality item pool (IPIP) scales; Goldberg, 1999) to see if a relationship existed between individual differences and performance on the proof-reading task. There is only a limited amount of research on narrow traits in predicting performance in specific contexts. Most research has focused on the broad big five traits. There is a need to produce more evidence that narrow

traits are useful predictors of performance. This experiment only looked at performance on a relatively simple proof-reading task and therefore provides no definitive conclusions about the relationship between narrow traits and performance across situations. It will hopefully add support to previous studies showing links between certain traits and performance. It should also provide some direction for future studies of a similar nature. Due to time constraints, it was not reasonable to administer the entire 300 item inventory from the NEO-IPIP scales. Therefore, previous literature was used to determine which facets were likely to relate closely to performance on a proof-reading task. This was also done to avoid the processing of redundant data, as many of the facet level traits almost certainly have no relationship with performance.

As conscientiousness has been found to be a useful predictor of performance in a number of cases (Barrick & Mount, 1991; Salgado, 1997) it seemed reasonable to include some of its facets. The experimental task for participants was to identify as many spelling errors as possible in a passage of text. One would expect most participants to try as hard as they can on the task. The NEO-IPIP facet achievement-striving looks at how focused on success a person is. An example item from this scale is *"I set high standards for myself and others"*. High scorers on this scale should do better on the task because they are self-motivated to do well. In the experiment high achievement-strivers are expected to do well as it is their nature. The trait achievement-striving is closely linked to the concept of need for achievement (n Ach). Phillips and Gully (1997) found a relationship between n Ach and task performance through goal setting. The measure of performance for their study was grade and test score for a first year university course.

Another trait at the facet level of conscientiousness is self-efficacy. This is the confidence a person has in their ability to deal with a variety of situations they may be faced with. An example item for self-efficacy is *"I excel in what I do"*. In terms of the

proof-reading task, this might also be an important individual difference factor. Someone who believes in their ability should be able to put the effort in to do well. Judge, Locke and Durham (1997) found a relationship between self-efficacy and performance in their study on the linkage between core self evaluations and job satisfaction and performance. Although their study looked at dispositional predictors outside the big five, the facet level of the big five does include self-efficacy. Phillips and Gully (1997) found a direct .23 correlation between self-efficacy and performance in a first year university course.

One final facet of conscientiousness included was self-discipline. This trait measures how much a person is willing to expend effort in pursuit of a higher goal. An example item from the NEO is *"I get to work at once"*. It has been studied for its relationship with performance on tasks requiring persistence over time. Duckworth and Seligman (2006) found that one of the main reasons girls outperform boys at school is not due to their IQ but their level of self-discipline. A person who exhibits a high level of self-discipline can remain focused on achieving goals and is able to avoid distractions. The trait has not been looked at for short-term goal attainment. However, a link possibly exists. Self-disciplined individuals in this experiment are expected to work hard to get what is required done.

The last NEO facet examined for its relationship to performance on the proof-reading task was openness to experience – intellect. Intellect measures how much a person enjoys taking part in mentally challenging activities and learning new things. An example item from the NEO is *"I can handle a lot of information"*. Due to the content of the items in this scale one would typically expect a reasonable positive correlation between intellect and intelligence. Research has shown considerable links between verbal intelligence tests and openness/intellect (Ashton, Lee, Vernon & Jang, 2000). However, relationships between intellect and numerical ability tests appear to be weak. In terms of a proof-reading task, only verbal ability is really necessary. Therefore, participants high on the trait of intellect

should perform well. More intelligent people generally read more and involve themselves in things that challenge them. Because we know from the myriad of research that intelligence correlates around .5 with job performance (e.g. Schmidt & Hunter, 1998), it makes sense that intellect should also correlate positively with performance. This trait has hardly been looked at in personality and performance research. One reason why openness and its facets are usually ignored is because they do not tend to correlate highly with performance. Griffin and Hesketh (2004) explained why the low correlations existed by showing that the construct of openness to experience has two sub-factors. These sub-factors are openness to internal experiences and openness to external experiences. When measured separately, the latter sub-dimension yielded positive correlations with performance, whereas the former yielded negative correlations. They argued that openness to experience should be looked at as two separate factors when measuring performance relationships. The facet intellect falls into the openness to external experiences factor and therefore may correlate positively with task performance.

The personality questionnaire also included two facets that do not typically correlate positively with performance. The reason for their inclusion was to make sure not all traits are correlating positively with performance. The traits were neuroticism – vulnerability and agreeableness – modesty. People high on the trait vulnerability tend to be more hesitant in unfamiliar situations. They also panic and feel unable to cope. An example item from the NEO is *"I get overwhelmed by emotions"*. People high on the trait modesty feel that they are not better than other people. They also tend not to seek special attention. An example item from the NEO is *"I dislike talking about myself"*. Although it is true that intelligent people can be modest, as they wish to hide that aspect of themselves, the trait does not correlate positively with task performance.

An attempt was made to establish relationships between the individual difference predictors and performance on the proof-reading task. If they return similar findings to those of other studies it will provide further support for the use of lower order traits in predicting performance. If only small effects for personality are found, this may indicate that the goal and priming tasks suppress their effects. In addition, if significant main effects are found for priming and goal, as well as a two way interaction effect, analyses will be performed to see if any of the facets are having different effects across the four groups. It is difficult to know whether or not individual differences will have a greater effect on any of the groups. Participants with high scores on the three conscientiousness traits and openness – intellect should perform best in the no priming – 'do your best' condition because they are capable of performing without additional motivation. However, Latham (2007) points out that people high on conscientiousness tend to respond to motivational cues such as goals if they are present.

H5: The traits of achievement-striving, self-efficacy, self-discipline and intellect will have a significant positive effect on performance in the proof-reading task. The traits of vulnerability and modesty will either have no relationship with performance on the task or show a negative relationship.

H6: Participants with high scores on the three conscientiousness traits and openness – intellect should still perform well in the no priming – 'do your best' condition because they are capable of performing without additional motivation.

Pilot Study: Method and Results

A pilot study of six people was undertaken to see how each aspect worked before it was given to the main sample. The sample included undergraduate students from the University of Canterbury. Overall, there were three males and three females, with ages ranging from 18-24. These participants were rewarded with a $5 café voucher for their time.

Three participants were assigned to the priming task and the other three were assigned to the no priming task. Both tasks involved unscrambling 20 sets of five words to make sentences using four of those words. The priming group received twelve achievement-oriented words amongst their word sets to create a priming effect. The no priming group were given only neutral words. All participants then did the same proof-reading task. They were given three minutes, which is not adequate time to complete the task. The dependent variable, number of spelling errors circled, was recorded to see what the second manipulation, the high conscious goal/target should be set at for the main sample. Upon completion, participants were given six facet level personality scales from the NEO-PI-R (Costa & McCrae, 1992) to respond to. This was included to determine the actual length of the experiment, which allowed for a decision on appropriate participation incentives to be made.

All six of the participants correctly unscrambled all 20 sentences. This indicated that no changes were necessary for this task. If errors had been frequent, alterations to the sentences would have been made. The average number of errors found in the spelling correction tasks was 29. Scores ranged from 21 to 35. The pilot sample was small so it was not used to determine differences between groups. It was used to determine the level of the difficult goal for the main study. This goal was set at 40 errors. This number was chosen

because nobody in the pilot study reached it but a couple got close. Participants took between 15 and 20 minutes to complete both tasks and the questionnaire.

Method

Participants and Design

A sample of 100 undergraduate students from the University of Canterbury participated in the experiment. Of these, 15 were recruited from the 1st year laboratories, where participation is rewarded with 2 per cent course credit. The other 85 participants received a $5 café voucher as an incentive to participate. The sample included 72 females and 28 males. The average age was 22.47 with a standard deviation of 5.84 and ages ranging from 18 to 52. This experiment was a 2 (prime, no prime) x 2 ("do your best" or difficult goal) ANOVA design.

Measures

For the final part of the experiment, six facets of the NEO-PI-R (Costa & McCrae, 1992) were administered. The facets included: conscientiousness – self-efficacy, achievement striving, and self-discipline; openness – intellect; agreeableness – modesty; neuroticism – vulnerability. Each facet contained ten items with alphas of: .78, .78, .85, .86, .77, and .82 respectively. All items were randomly entered to limit response biases. Sixty items were responded to on a 1-5 likert scale, with indicators ranging from 1= very inaccurate to 5= very accurate. An example item is: "*I turn my plans into actions*". (See Appendices F and G for a full list of items and their scales).

Treatment Manipulations

The first manipulation was the priming task. This followed the method developed by Srull and Wyer (1979), which is a proven method for priming. The manipulation in this

experiment is basically a direct replication on Stajkovic et al.'s (2006) priming task. Participants were instructed to construct a grammatically correct four-word sentence (e.g., *It was hot today*) from a set of five randomly positioned words (e.g., *hot was it today blouse*). Each participant in the priming condition received the same twenty word sets. Twelve out of twenty sets (60%) contained one achievement oriented word. These included: *goal, succeed, motivation, studied, focus, achieved, accomplish, effort, aced, ambitious, endeavour, exceptional.* In the no-priming group, all words in the twenty sets had nothing to do with achievement.

The second manipulation was the set conscious goal. As previously mentioned, the level of this goal was partially determined by the pilot study and partially determined by basic judgement. It was presented to participants prior to them commencing the spelling error circling task. All participants were given written instructions to find spelling errors in an exert of writing and put a circle around each error they found. Those in the difficult goal group were instructed to attempt to find at least 40 errors in the time allowed. The other half of the participants were simply instructed to "do your best". The exert chosen was a piece of writing from a history book on Queen Elizabeth I. This was chosen because few, if any of the participants would have seen this text. This eliminated any advantage due to prior experience. In all, there were a total of 98 possible spelling errors, over three pages of double-spaced text.

Procedure

The laboratory where the experiment was conducted had space for three people plus the experimenter. Participants were run individually, in two's or in three's. This depended on their availability. Upon arrival at the laboratory, participants were randomly assigned to one of the following groups: priming – difficult goal; priming – "do your best"; no priming

– "do your best"; no priming – difficult goal. In order to avoid biasing the results, they were not made aware of this until after the experiment was over. All participants received a booklet containing the tasks and personality questionnaire. Identities were protected using unique codes. Names of participants were not written in the booklet. Age and gender were the only demographic variables sought. Participants completed the priming task by unscrambling the word-sets to make sentences. If more than one participant was in the laboratory they were informed that they were not in competition and accuracy of answers was most important. No time limit was enforced, as full completion of the task was necessary.

Upon completion of the priming task, the researcher instructed participants to turn the page to the next task. They were given a verbal instruction to "circle only the words which are spelt incorrectly". After this, they read the written instructions (see Appendices D and E). This is where the experimental manipulation was given. Half the participants saw the statement "attempt to find **40 errors** in the time allowed". The other half saw the statement "do your best". The time allowed for this task was three minutes. The length of the exert was such that it was not possible to complete fully, as this could create a ceiling effect in the results.

Once time was up, participants were instructed to turn the page and complete the personality scale. Clear written instructions were printed in the booklet above the scale. After this was completed, a full verbal and written debriefing was provided to ensure no undue harm had occurred. The extent of what they had done was fully explained and participants had the opportunity to withdraw their data.

A manipulation check was carried out on participants in the priming condition. They were asked by the experimenter "Did you notice a recurring theme amongst the words? If so what was the theme?" Only five out of fifty participants were able to recall something to

do with achievement. These participants were then asked whether they realised this task was linked in any way to the second task. None of the participants were able to do this, therefore it was decided not to exclude their data.

Participants received their reward and were free to leave the laboratory.

Results

Priming Check

On average, participants unscrambled 18.93 of the twenty sentences in the priming task. Averages for each group were 18.68 and 19.18 for the priming group and no priming group, respectively. Sixty out of the 100 correctly unscrambled all twenty sentences. It is not greatly important that participants unscramble all of the sentences correctly. For the priming group, it is just important for participants to be processing the achievement-oriented words. For the no priming group it makes no difference because none of the sentences should have any influence. One comment here is that the no priming group may have had slightly easier sentences to unscramble. However, this does not affect the outcome of the experiment because the task for the no priming group should have no influence on performance.

Main Study

The data was analysed at two separate stages. The first stage involved finding out whether a difference existed between the groups on the number of spelling errors they circled in the experimental task. A 2 (priming) x 2 (goal) ANOVA was conducted. A significant main effect was found for goal, $F(1, 96) = 5.82$, $p < .05$. No main effect was found for priming $F(1, 96) = 0.66$, *ns*. Furthermore, the priming x goal interaction term was not significant, $F(1, 96) = 3.25$, *ns*.

A post-hoc analysis, using Tukey's HSD (honestly significantly different) test, showed that a significant difference in means existed between the priming – difficult goal group and the priming – "do your best" group. None of the other groups differed significantly. It may appear that this supports the hypothesis that the difficult goal coupled with priming should perform best. However, without finding a difference between this and the other two

groups (no priming – difficult goal, no priming – do your best) this result must be interpreted with caution.

Table 1 below, shows the descriptive statistics for the experiment. The graph in *Figure 1* shows the interaction between priming and goal setting. No significant interaction was found but it was close. The graph provides a visual representation of the information provided in *Table 1*. It shows the clear difference between the priming, difficult goal group and the other three. The priming only and difficult goal only groups did not differ in number of spelling errors circled from the group instructed only to 'do your best'.

Table 1: Descriptive Statistics in the Experiment

Condition	Observed Mean	SD	SEM	95% confidence interval	
				Lower bound	Upper bound
Descriptive statistics for priming main effect					
Prime	24.62	11.54	1.63	21.36	27.88
No Prime	22.96	7.80	1.10	20.76	25.16
Descriptive statistics for goals main effect					
'Do your best'	21.54	7.74	1.10	19.34	23.74
Difficult	26.04	11.18	1.58	22.88	29.20
Descriptive statistics for the interaction between priming and goals					
Priming					
'Do your best'	20.60	8.31	1.66	17.28	23.92
Difficult	28.64	13.00	2.60	23.44	33.84
No priming					
'Do your best'	22.48	7.18	1.44	19.60	25.36
Difficult	23.44	8.50	1.70	20.04	26.84

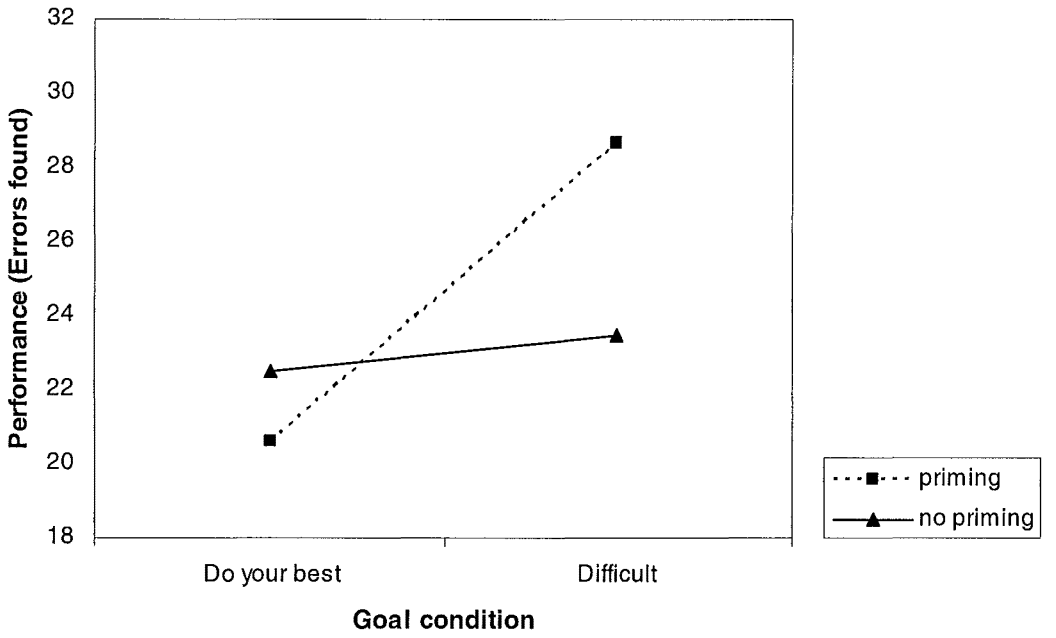

Figure 1. Graph of results. Interaction between priming and goals.

Personality Relationship

Part two used the results of the experiment to see what kind of relationship some relevant facet-level personality variables had. A correlation matrix was observed, showing the relationships between each of the variables and performance on the proof-reading task. This is presented in *Table 2*, below. Intellect, self-efficacy, and achievement striving showed positive correlations with task performance. Of these three, the only variable with a correlation of real importance was intellect, which correlated .24 with task performance. The two variables expected to have no relationship were modesty and vulnerability. The results show that this was the case. Surprisingly, self-discipline has no relationship with task performance. The correlations between personality facets were in the expected direction. The correlations of the three conscientiousness facets with each other ranged between .47 and .68. All four of the facets expected to correlate positively with performance had negative correlations with modesty and vulnerability, as expected. The

openness facet of intellect correlated .48 with self-efficacy and .40 with achievement striving. Coefficient alphas for the six scales were also calculated. These ranged between .69 and .88. They were similar the alphas reported in the IPIP (Goldberg, 1999), which means they match the population.

Table 2: Correlation matrix of task performance and personality facet variables

	TP	Vuln	Mod	Intel	SE	Ach	SD
TP							
Vuln	.06	(.86)					
Mod	-.01	.27	(.76)				
Intel	.24	-.34	-.21	(.84)			
SE	.14	-.56	-.22	.48	(.69)		
Ach	.19	.35	-.30	.40	.57	(.83)	
SD	-.01	-.35	-.13	.16	.47	.68	(.88)

* Observed reliabilities for each scale are in brackets on the diagonal. TP= task performance, Vuln= neuroticism – vulnerability, Mod= agreeableness – modesty, Intel= openness – intellect, SE= conscientiousness – self-efficacy, Ach= conscientiousness – achievement striving, SD= conscientiousness – self-discipline.

Effects of personality variables on task performance

The data from the experiment was included with the six personality facets in an analysis of covariance (ANCOVA). This method was used to determine what effects, if any, the personality variables had on the outcome of the experimental part of the project. Again, the effect of goal was significant $F(1, 90) = 4.46, p < .05$, as this method is essentially an ANOVA with continuous variables added to it to test their effects simultaneously. The effects of priming $F(1, 90) = 1.60$, *ns,* and the interaction $F(1, 90) = 2.72$, *ns,* were again not significant. The results of each of the six personality facets are as follows: vulnerability, $F(1, 90) = 3.00$, *ns,* modesty, $F(1, 90) = 0.12$, *ns,* intellect, $F(1, 90) = 3.90, p = .05$, self-efficacy, $F(1, 90) = 0.13$, *ns,* achievement striving, $F(1, 90) = 2.39$, *ns,*

and self-discipline, $F(1, 90) = 1.52$, *ns*. The only facet showing an effect was intellect, although it is right on the cut-off at .05. Because the result was borderline significant, a follow-up ANCOVA was carried out with only intellect as the continuous predictor. A significant effect was found for intellect, $F(1, 95) = 6.12$, $p < .05$. This means that there is an effect, Although one would expect to see an increase in significance when the variance accounted for by other variables is removed. It can be said that being intellectually efficient helps performance on language-type tasks.

Differences in personality effects across groups

A series of two-way ANOVAs were performed to test the final hypothesis that participants high on the three conscientiousness traits and openness – intellect should still perform well in the no priming – 'do your best' condition because they are capable of performing without additional motivation. These participants are compared to participants low on the four traits. Two new dichotomous variables were created to allow for these analyses to work. Participants' scores were divided into 'high' or 'low' based on their self-reported scores for each trait. The cut-offs varied across traits, to make sure there was a reasonably even number of people in the 'high' and 'low' groups. Each of the traits were analysed separately, as some participants were high on one trait and low on another. The second dichotomous variable was created to differentiate the no priming – 'do your best' group from the other three. The key statistic is the interaction between the dichotomous group variable and the 'high' or 'low' group variable. For each trait, a significant interaction in the hypothesised direction would mean participants high on the trait would outperform those low on the trait in the no priming – 'do your best' group but there would be less difference between participants high on the trait and low on the trait in the other

three groups. A visual interpretation of the hypothesised interaction effect is shown below in *figure 2*.

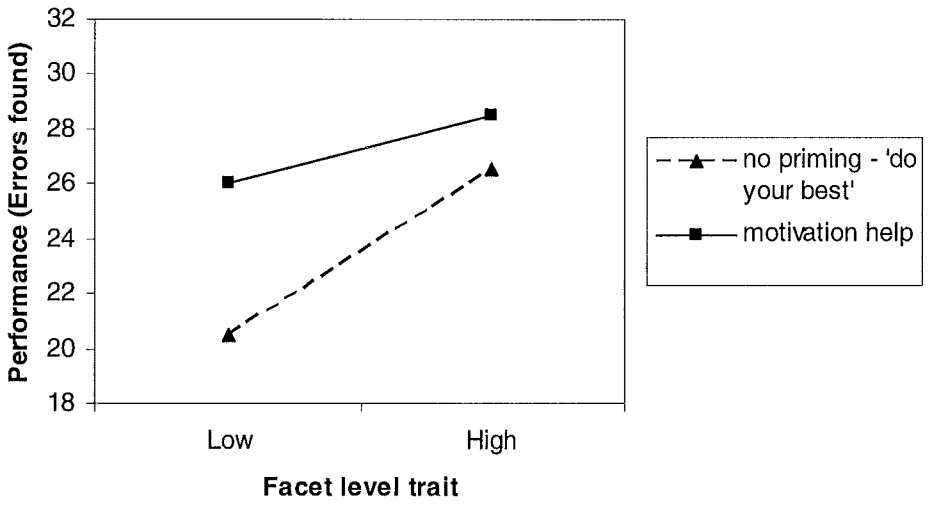

Figure 2. Example of expected interaction effect for trait level x group.

A significant interaction effect was found for achievement striving, $F=3.92$, $p< .05$. This means that people who strive to achieve in life are capable of performing well when they have no additional motivation to do so. The results of the other three ANOVAs were: $F(1,96)= 1.41$, *ns;* $F(1,96)= 2.44$, *ns;* and $F(1,96)= .54$, *ns;* for intellect, self-efficacy, and self-discipline, respectively. It is important to note that because the variables are essentially split in two, the number per group is halved. This makes it difficult to achieve statistical significance. Therefore, there is something to gain from the non significant findings. It is possible to say that that hypothesis six is supported with regards to achievement striving and to a lesser extent, self-efficacy and intellect.

Discussion

Goal setting and priming

This experiment was successful in supporting the hypothesis that difficult performance goals should lead to higher task performance than 'do your best' goals. The two groups instructed to "attempt to circle 40 errors" in the time provided outperformed those not given a specific target. This supports the findings of a meta-analysis reported by Locke and Latham (1990). These findings are not providing anything new to goal setting research. However, it proves that Stajkovic et al. (2006) should have included this hypothesis. They perhaps failed to do so because their results did not support it. In their experiment participants in the 'do your best' group recalled more uses for a wire coat-hanger when primed than participants in the difficult goal group with no priming. There is the argument that the priming had a bigger effect than the goal but they failed to show a priming effect for the easy goal group. This aside, the differences in the experimental tasks may have contributed to this difference in results. The goal may be more useful for proof-reading tasks and priming may have a greater effect for tasks requiring creativity.

The hypothesis that participants given the achievement priming would do better was not supported. This indicates that priming participants with words associated with achievement prior to them doing a proof-reading task does not aid their performance. Of course it is not possible to generalise these results when only one type of task was used. Priming is perhaps just not useful for tasks that require the checking of errors in texts. There is no simple explanation as to why this result was found. If there was, this experiment would have been ignored and a different task used. One potential explanation is that proof-reading relies on reading speed, which cannot be improved much by priming. However, goal setting had a positive effect on performance. Proof-reading also relies on the ability of a person to read carefully and see subtle problems with a document. It could be

that a difficult goal provides something to strive for, as Locke and Latham (1990) suggest. Although participants did not consciously pick up on the achievement-oriented words, cognitive theory suggests that their brains would have done so unconsciously. Even so, this may have been overridden by the brain not interpreting the circling of as many errors as possible in the proof-reading task as an achievement in its own right. If this was the case priming would be a waste of time because the task requires the brain to make this linkage.

It was also hypothesised that the group given both achievement priming and the difficult goal would perform best. This was clearly supported. One must proceed with caution in interpreting this finding. A possible explanation for this finding is that a combination of priming with words associated with achievement and the difficult goal to circle 40 errors in the proof-reading task worked together to create a more powerful effect. Although this group circled far more spelling errors on average, there are still a couple of issues. Firstly, the group who received priming but not the difficult goal performed poorest of the four groups. This finding is inconsistent with Stajkovic et al. (2006), who found priming effects existed for both the 'do your best' and difficult goal groups. Bargh et al. (2001) showed that priming alone can be effective in performing tasks. An alternate explanation, is that priming is more useful when coupled with a difficult goal. However, the research just mentioned does not support this explanation. Secondly, the group given only the difficult goal only slightly outperformed the group given neither of the supposed advantages. The difference between these two groups was not significant. Finally, the high standard deviation for the group given both of the supposed advantages indicates that there were more extreme scores within this group. This was mainly at the higher end. This may be indicative of the people who responded best to the priming and goal. However, it might also mean that people better at proof-reading tasks were randomly selected into this group

more than other groups. The wider implications of this particular finding will be discussed later in this section.

No significant interaction effect was found. A significant result in the expected direction would leave grounds to conclude that achievement priming, when combined with a difficult goal works well but neither method is as effective when given the instruction 'do your best'. This aside, the interaction effect for this experiment was very close to being significant at the *.05* cut-off. This means future experiments should further investigate the priming x goal interaction, using a larger sample. The graph in *Figure 1*, above showed that an interaction is present in a visual sense. This is promising in terms of the outcomes of the experiment. The possibility exists that it could be useful to give a difficult goal or workplace target to employees after they have been exposed to achievement-oriented words. This method is not useful when participants are given ambiguous goals or targets, such as 'do your best'.

It must also be taken into account that the two methods may feed off each other. The group given the difficult goal alone did not greatly outperform the group who received neither of the hypothesised advantages. Therefore, the possibility exists that difficult goals do not help improve performance in all situations. Sometimes other motivational techniques, such as priming, may improve the effect of goal setting. Hence, there is possibly a congruence between the two methods. The priming task exposes participants to words associated with the concept of achievement, whereas the difficult goal encourages participants to work hard and try to exceed their usual standards of performance. When presented with the statement 'do your best', as opposed to the quantitative goal, participants given the achievement priming lose this effect because they are not sensitive to the statement. There is no longer a need for them to push themselves. Although there are alternative explanations, this one addresses the fact that participants primed with

achievement words and then instructed to circle 40 errors or more in a proof-reading task perform best on the task.

Stajkovic et al. (2006) had similar findings in terms of the interaction effect. Their priming group did better when given the difficult goal. They found an interaction because both primed and unprimed participants in the easy goal condition scored the same. The easy goal condition was left out of this experiment because it is pointless in most tasks. If an employee is told they only need to do a small amount of work to reach their target, they will probably not bother exceeding the target. Moreover, companies want employees to work hard and reach their potential. This further exemplifies the idea that priming is negated by a goal or target which is too low or too ambiguous. The most important finding for theorists to consider is the theory that difficult, yet attainable goals are best in many workplace scenarios but may be facilitated by some form of achievement priming.

Personality variables and task performance

It was thought that the extent to which a person wants to achieve, the belief they have in their ability, their level of self-discipline, and their intellectual efficiency would be positive predictors of performance. The results of the ANCOVA suggest that amongst the individual difference variables examined, being intellectually efficient is the best predictor of performance when the task involves editing documents. Having high self-efficacy and the disposition to strive for achievement may also help performance, as there were reasonable correlations with task performance for these two traits. Furthermore, of the Big Five, conscientiousness tends to correlate highest with performance across a range of situations (Barrick & Mount, 1991). Our results failed to find a statistically significant outcome, although different samples may find otherwise. The intellect scale includes items such as *"I have a rich vocabulary"* and *"I love to read challenging material"* (refer to

Appendix G for the full list of items). These are clearly associated with the task of reading a document and circling spelling errors. This finding appears to support the notion that some facets of openness to experience do correlate with task performance, as Griffin & Hesketh (2004) previously found.

Even though correlations were not particularly high, discussion about the relationship between intellectual efficiency, self-efficacy, achievement-striving and performance is warranted. Enjoying the challenge of a difficult book, having a large vocabulary and enjoying philosophical discussions should enable a person to read and write at a high level. This would make people who are intellectually efficient suited to work where reading and writing is a major component. This will be discussed in more detail under the implications heading. Having a disposition to achieve and belief in your own capabilities are important for tasks where performance is required, regardless of the rewards. The NEO-IPIP facets self-efficacy and achievement-striving generally correlate well with task performance across the literature.

Intellect is highly correlated with achievement-striving and self-efficacy but not self-discipline. These are the two facets which had the next best correlations with performance in the proof-reading task. Because intellect correlates highly with some facets of conscientiousness it makes sense that it should correlate with performance in a wider range of tasks. Some issues with discriminant validity arise when it is correlated with verbal ability. Ashton et al. (2000) reported high correlations between the two but went on to say that these are not great enough to discredit the construct of openness/intellect. Moutafi, Furnham and Crump (2003) also found evidence of this relationship. They went on to say that sub-traits of openness, such as intellect, are important to an individual expanding their learned knowledge. Although there are still a number of issues to resolve, some steps have

been taken towards displaying the usefulness of narrow bandwidth traits such as intellect, in workplace activities such as recruitment and selection.

The finding that participants who rate high on achievement-striving do not require additional motivation to perform is not surprising. People who state that they set high standards for themselves and are motivated to succeed should perform well to satisfy this disposition. The interesting aspect of this finding is that intellectual efficiency did not stand out this time. People high on this trait but not as high on achievement-striving may respond to outside motivation to perform at a higher level.

Individual differences in cognitive ability

This experiment did not look at cognitive ability as an indicator of performance. The importance of cognitive ability in most jobs was briefly touched on in the introduction. It is a better predictor of task performance than personality. Cognitive ability can be broken down into groups measuring specific abilities. The proof-reading task requires verbal competence to perform well. Some participants circled a very low number of errors in the time provided. Some of these were students whose first language is not English or had problems such as dyslexia. Other low scorers may simply have lower verbal ability or a slower reading speed. There is virtually no doubt that verbal ability and reading speed would have a significant positive effect on proof-reading performance. People with a high level of understanding of written words and sentences should be able to see errors and move more quickly through the task.

There are a few reasons why this experiment did not control for verbal ability. Firstly, previous experiments of a similar nature have not controlled for the effects of cognitive ability. It is known that random selection of participants into groups should control for these effects. For example, Stajkovic et al. (2006) used a task where problem solving

ability could contribute to success. They did not test to see whether this had an effect. Secondly, this experiment was pushing time limits in terms of getting a large enough sample to take part for the reward they received. Adding a measure of verbal ability would mean a further 10-15 minutes for each participant. Thirdly, if it was used to assign participants to groups, they would have to be completed prior to the experiment. This is a problem because participants may be able to guess the purpose of the experiment. They would also have to be scored, meaning more time per participant. Finally, numerous experiments have shown ability to be a factor, so finding that cognitive ability and task performance are related would prove nothing scientifically.

It is impossible to control for individual differences on tasks such as the one in this experiment. Everyone is different and it is pointless trying to control for everything. Even if more had been done, the results would probably have still turned out much the same. Locke and Latham (1990) make a case for controlling for cognitive ability in experimental research involving goals. However, most goal setting experiments do not bother to control for it, preferring to let random selection balance out these effects. Mitchell and Jolley (2004) state that it is not always important to control for such variables because random assignment should account for these differences. The power of the effect of the manipulations should be strong enough that random selection is fine. However, future research might want to look at cognitive ability, especially if the experimental task appears to be affected by it.

'Strong' versus 'weak' situations

Something which must always be factored in to personality research is the idea of 'strong' versus 'weak' situations. To recap, a situation can determine the way people behave (Tett & Burnett, 2003). The strength of a situation varies across situations, making

it important to take in to account when studying the effects of personality. Hattrup and Jackson (1996) talk about studying behaviour as an interaction between the person and the situation. They call this the interactionist approach. In laboratory experiments participants are usually restricted because they do not know what they are going to be doing. This limited preparation may create anxiety for some participants. The situation has the potential to dominate the actions of the person, as they are confronted with an experimenter they do not know and feel obliged to act in a certain way. This could have occurred in this experiment, especially since very few of the participants would have been involved in an experiment of this nature. In the workplace, situational effects are low on many tasks. Employees are often familiar with the practices and ways to perform tasks. They also know their supervisors and co-workers. If research is conducted in a real work setting, results for priming and goal setting should be better.

Research implications

As this project is a modified replication of a pioneering experiment, implications are not far reaching. The aim was to show that priming for achievement can be combined with goal setting to act as a better motivational aid for task performance in a more work-related task than that used in previous research.

Finding that participants presented with a difficult goal perform better than participants instructed to 'do your best' does not add much to goal theory (Locke & Latham, 1990). However, it shows some flaws existed in the initial research undertaken by Stajkovic et al. (2006). The most important finding is perhaps the fact that combining priming and a difficult goal clearly leads to higher performance. Although further analyses are needed to establish the size of this effect, it is highly probable that one exists.

Pending further research, a few practical applications can be noted. When priming is used strategically and not too frequently in combination with a challenging goal or target it has the potential to improve performance. Stajkovic et al. (2006) gave the example of placing achievement-oriented words inside the front cover of training manuals for new employees. It was felt that this may help improve training performance. This could work because employees would probably only glance at the words for a split second, thus creating a priming effect. A strategy not mentioned by Stajkovic et al. (2006) is to have computer screen savers with words appearing for a matter of milliseconds on the screen. A few of these words could be achievement oriented. If office employees return from a break, seeing these words without conscious awareness may lead to improved performance. Bearing in mind, this may work only when employees are consciously aware of their performance target.

This project has also added to our understanding of the effects of individual differences on performance in language-type tasks, if only on a very small scale. More research is needed on the facet-level of openness to experience. The intellect facet correlates with performance on the proof-reading task, meaning an intellectually efficient person should perform well in tasks such as report writing, checking, and researching. This facet could be useful in predicting performance for a range of tasks involving language skills. Although it is nothing new, the conscientiousness facets self-efficacy and achievement-striving and performance correlated positively. When hiring staff in typist, editing, or writing positions, testing for the above three narrow traits could provide useful information about the candidate when combined with other selection techniques.

Finally, if future research concludes that the combination of priming and goal setting in the workplace is useful, it might not be necessary to use it on just anybody. High achievement-oriented employees generally perform to a high level to fulfil their disposition

to achieve. Providing additional motivation might be a waste of time and resources. There may also be other dispositional factors which allow for high performance without outside assistance.

Limitations and future research suggestions

There are a few limitations to the research. These are discussed below, along with suggestions of how future research may wish to overcome some of these limitations.

This experiment used a sample of 100 university students. Although this was adequate for the research aims, using a larger sample could lead to finding more significant relationships. This would be of particular benefit to the interaction effect, as the result was approaching statistical significance. More valid conclusions could be made about the effect, as well as practical implications for the use of priming and goal setting in the workplace. On the up-side, this experiment did have higher power than the Stajkovic et al. (2006) experiment, which had half as many participants per group. Therefore, the results of this experiment are a step in the right direction.

The student sample in this experiment had an average age in the low twenties. It was also mainly Caucasian and had more females than males. This leads to a restriction of range, particularly in terms of GMA and personality. A large proportion of university students rate themselves high on conscientiousness items. To avoid this problem, future experiments should try to use a real workplace with a large, diverse range of employees as the sample group. There are obvious hurdles to conducting experimental research in workplaces. Managers are unwilling to allow company time unless they stand to benefit from the activity. Employees are unlikely to participate in an experiment outside of work hours unless a substantial reward is offered. There are possible ways to use priming and

goal setting in quasi-experimental designs. However, anybody considering this would have to contend with the environmental obstacles presented to them.

Another limitation is that the task of reading through a passage and picking out the spelling errors is not perfectly generalisable. It was chosen, as it is an easy task for university students that would not favour any type of student. The intention was also to have a task that participants were capable of doing without making many mistakes. Although this seems like it would lead to clear differences between groups based on the manipulations, it did not have this effect. Participants all knew what was required of them (circle spelling errors in the three minutes provided). This may have made them less responsive to goals and priming. Locke and Latham (1990) state that specific goals help motivate people to work harder when the task is ambiguous or unclear. Telling someone what is required to be successful on the task provides them with a sense of direction, allowing them to organise their actions towards attaining the goal. The simplicity of the proof-reading task may have meant that performance cues were ignored to an extent.

A resolution to the above problem is to change the experimental task. One of the problems with the Stajkovic et al. (2006) experiment to begin with was the lack of real world applicability. Having participants name uses for a wire coat-hanger is not transferable to many jobs. The task also needs to be short, unless large amounts of funding are available to the researchers. There are few tasks that fit these requirements and allow priming and goal setting to have an impact. One idea is that participants be instructed to list different ways to solve a complex managerial problem. They would be scored on how many different solutions they came up with. Prior to doing this they would complete a priming task and the same research design as this experiment would be used. For this type of task, the researcher would have to employ subject matter experts to come up with all the feasible solutions associated with the problem. There should be a higher weighting given to

better solutions. This would avoid participants giving a list of solutions which would not benefit a company. Hopefully, a task similar to this would show effects for priming, goal and a combination of the two. This might work because priming should influence the levels of motivation in a person if it is directed correctly. Higher motivation should lead to more effort and better performance.

The fourth limitation involves the applicability of priming in the real world. Realistically, priming is not useful in all situations related to maximising the performance of employees. If it was used every day on people, they would become desensitised to it and it would have no effect. More research is needed to investigate the extent to which it may be useful. Future research could investigate the relationship between priming and different types of goals. The results of this experiment and Stajkovic et al. (2006) indicate that it works best when a challenging goal is also presented.

Finally, future research may wish to extend the experiment, if funding permits. The idea would be to have participants turn up to the laboratory two to three times. The first would be to give the priming and goal tasks. The follow-up(s) would be run to test whether the priming effects last over time. Stajkovic et al. (2006) did a 24 hour follow-up in their experiment and found the effects lasted. Because their sample size was very small further investigation into this effect is needed. Also, very little previous research has found lasting priming effects for the task they used. A 2, 4 or 6 hour follow-up could be useful in the workplace. If successful, it may be possible to administer priming and a goal/target when the employee begins work, with the effects holding throughout the day. A two or three day follow-up could also be tested, although priming is unlikely to hold for this length of time. Furthermore, many workplace tasks often require hours or days to complete. If the resources are available, an experiment using a task which participants are given half an hour or more to complete may provide better information about the effects of priming.

Conclusion

Simply going on the results of Stajkovic et al. (2006) and Bargh et al. (2001) is not enough to make any changes to the workplace. This experiment did not aim to achieve this either. The results suggest that there is some hope for the concept of combining priming and conscious goals for workplace tasks. However, more experimental research is required to determine if results hold across different workplace tasks. Only some workplace tasks may be able to incorporate both forms of motivation and even then it might be a waste of valuable time. Furthermore, as employees form strategies for completing familiar tasks, outside motivational techniques may have little or no effect on performance. This experiment showed that priming does not have an effect on a proof-reading task by its self. Difficult tasks requiring individuals to be motivated to perform well may show an effect for priming. It would be a challenge to get a company to trial a system without hard evidence of its effectiveness in a laboratory setting. If future research is able to implement it in a workplace more conclusions of its usefulness may be drawn.

The evidence supporting dispositional effects on performance for the proof-reading task is only minor. Conscientiousness facets from the NEO-IPIP scales had only a small relationship with performance. As expected, the openness facet intellect had a relationship with task performance, as things such as having a wide vocabulary would be of benefit to a task involving words. Results also indicate that achievement-oriented individuals can work hard without additional motivation. This is to be expected. Other factors such as verbal ability and overall cognitive ability probably have a higher relationship with performance than personality does.

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Appendix A: Information for Participants, Consent Form and Debriefing Sheet

College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Department of Psychology

Sentence and spelling correction tasks and dispositional effects on performance

Information for Participants

You are invited to participate in an experiment on how well participants complete two tasks related to spelling and grammar. This experiment is run by Scott Tatom as a requirement for the MSc in Industrial/Organisational Psychology under the supervision of Dr Sasha Chernyshenko.

To begin with, you will complete two tasks in the time allocated by the experimenter. You will then fill out a short personality questionnaire. It is expected that the combined activities will take approximately 30 minutes of your time.

Your identity will be kept confidential at all times. Number coding will be used instead of your name to identify your data. You have the right to pull out of the experiment at any time. This will result in the withdrawal of your data from any analyses but you will still be entitled to the incentive offered. You may also withdraw your data from the final analyses at any time during the experiment up until all data has been collected from respective participants.

If you have any questions regarding the experiment please direct these to either Scott Tatom 03 364 2987 extension 7500 or sat53@student.canterbury.ac.nz or Dr Sasha Chernyshenko extension 3632 or sasha.chernyshenko@canterbury.ac.nz.

I would like to take this opportunity to thank you for giving up your time to be a part of this experiment.

College of Science

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Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Department of Psychology

Sentence and spelling correction tasks and dispositional effects on performance

Consent Form

I give consent to participate in this experiment on the performance of participants on tasks related to spelling and grammar, with the knowledge that I can withdraw my results at any time up until all the data has been collected and analysed.

By signing this form I also accept that I will receive an incentive.

Name (please print): .....

Signed: .....date: ...../...../.....

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Department of Psychology

Sentence and spelling correction tasks and dispositional effects on performance

Debriefing Sheet

You were told earlier that you were participating in an experiment on completing tasks in spelling and grammar. Although this is true, there were some aspects left out on the information sheet to ensure your results were not biased.

The first task you completed was a priming task. For half of the participants, 12 out of 20 word sets contained a word associated with achievement. The intention of this was to prime those participants to improve their performance on the following proof-reading task.

Another manipulation not explained at the beginning was that half the participants were given a set goal of corrections to make in the three minutes allocated to the proof-reading task. The other half were not given a conscious goal.

The main purpose of the study was to see if those who received the priming task and those who were given a number of corrections to aim for on the proof-reading task would do best on average. Those who received no priming and no number goal should do poorest on the proof-reading task on average.

Furthermore, a personality questionnaire was administered. Participants self-rating high on personality characteristics related to achievement and working hard were expected to do better on the proof-reading task, whereas participants self-rating low on these characteristics are expected to do poorer.

This experiment has real world utility. Significant results could indicate that putting achievement oriented words in visible places such as training manuals and on computer screens may help increase performance.

If you feel in any way unhappy with the deception involved in this experiment please don't hesitate to raise this concern with the experimenter now. If you leave the laboratory and still have some concerns or you wish to withdraw your data please contact either:

Scott Tatom, 03 364 2987 then extension 7500 or sat53@student.canterbury.ac.nz
or
Sasha Chernyshenko, 03 364 2987 then extension 3632 or
sasha.chernyshenko@canterbury.ac.nz

Appendix B: Achievement Priming Task (given to priming group)

Please read the following set of instructions very carefully. Your task is to form a grammatically correct **four-word sentence** from each of the scrambled sets of **five words** below. This means that one word from each set will be left out. The sentences must make sense. You have seven minutes to complete this task. Once you are finished, await the instructions of the experimenter before proceeding.

hot was it today blouse = ...

got he goal his great = ...

turtle succeed to you work = ...

sunlight the melts snow unlikely = ...

you motivation against help will = ...

delicious fish siren the were = ...

Becky night airplane studied all = ...

your don't artfully focus lose = ...

I find lollipop them must = ...

impossible anger achieved Marty the = ...

our planet brush earth is = ...

a was Einstein fruitfully genius = ...

accomplish to blushed attempt things = ...

was it alike an effort = ...

test Susan aced rugby the = ...

truly walk he is ambitious = ...

the over polite fence jump = ...

do endeavour well missed to = ...

watch wears he insect a = ...

presentation exceptional require was the = ...

Appendix C: Neutral sentence task (given to no priming group)

Please read the following set of instructions very carefully. Your task is to form a grammatically correct **four-word sentence** from each of the scrambled sets of **five words** below. The sentences must make sense. You have seven minutes to complete this task. Once you are finished, await the instructions of the experimenter before proceeding.

hot was it today blouse = ...

watch wears he insect a = ...

curb for it ages went = ...

name breathing John is my = ...

the lies come to hospital = ...

she her coughed breakfast ate = ...

sunscreen easter rub my in = ...

sunlight the melts snow unlikely = ...

grazed breath a take deep = ...

I find lollipop them must = ...

delicious fish siren the were = ...

leave craziness Sue sick took = ...

Geoff to listened music specialised = ...

wear nappy black goths clothes = ...

a was Einstein fruitfully genius = ...

causes flip cancer smoking lung = ...

our planet brush earth is = ...

much lactose ate too Gary = ...

the over polite fence jump = ...

were keys motioning the lost = ...

Appendix D: Proof-reading task for group instructed "do your best"

In the following passage about Elizabeth I, there are a number of spelling errors. Your task is to correctly identify as many of these as possible by drawing a circle around them with the pens provided. **You do not need to correct the spelling**. None of the names of people or places are mis-spelled. There are no errors in punctuation or sentence structure either. You have **three minutes** to do your best to identify as many mistakes as possible. You will be instructed when the time is up and you must stop at this point. Don't worry if you do not finish the task in time, you're not expected to.

ELIZABETH I, Queen of England and Ireland, bron on Sunday the 7th of September 1533, and, like all the Tudors except Henry VII, at Greenwich Palace, was the only suviving child of Henry VIII by his second queen, Anne Boleyn. With such a mother and with Cranmer as her godfarther she represented from her birth the principle of revolt from Rome, but the opponents of that movement attached little importance to her advent into teh world. Charles V's ambassador, Chapuys, hardly deigned to menton the fact that the king's *amie* had given birth to a daughter, and booth her parents were bitarly disappointed wit her sex. She was, however, given precedence over Mary, his elder sister by sixteen years, and Mary never forgave the infant's offence. Even this dubious advantage only lasted three years until Elizabeth's mother was beheaded.

Elizabeth thus lost all hereditary title to the throne, and her early years of childhood can hardly hav been happier than Mary's. Nor was her legitimacy ever legally established; but afta Jane Seymour's death, when Henry steamed likely to have no further issue, she was by act of parlamint placed next in order of the succession after Edward and Mary nd their issue; and this statutory arrangement ws confirmed by the will which Henry VIII was empowered by statute to make. Queen Catherine Parr introduced some humanity into Henry's household, and Edward and Elizabeth were well and happily educated together, principally at old Hatfield House.

They were their when Henry's death called Edward VI away to greater dignities, and Elizabeth was lift in the care of Catherine Parr, who married in indecent haste Thomas, Lord Seymour, brother of the protector Somerset. This unprincipled adventurer, even before Catherine's deth in September 1548, paid indelicate atentions to Elizabeth. Any attempt to marry her with out the council's leave would have been treason on his part and would have deprived Elizabeth of here contingent right too the sucesion. Accordingly, wen Seymour's otter misbehaviour led to his arrest, his relations with Elizabeth were made the suject of a very trying investigation, wich give Elizabeth her first lessons in the art of self-defence. She proved equal to the occasion, partly becos she was in all probablity innocent of anything worse than a qualified acquiescence in Seymour's improprieties and a girlish admiration for his hansom face. His tragic fate may have tuched a deeper chord, but it was carefully concealed.

For he rest of Edward's rain Elizabeth's life was less tempestuous. She hardly rival Lady Jane Grey as the ideal Puritan mayden, but she swam with the stream , and was regard as a foil to heer stubborn Catholic sister. She this avoided the enmity and the still more dangerous favour of Northumberland; and sum unknown histry lies behind the duke's preference of the Lady Jane to Elizabeth as his son's wive and his own puppet for the throne. She thus escape shipwreck in his crazy vessell, and rode buy Mary's side in triumf into London on the failure of the plot. For a times she was save enough; she wood not renounce her Protestantism untill Catholicism had been made the law of the land, but she followed Gardiner's advice to her father when he said it was better that he should make the law his will than trie to make his will the law.

It was not so much Elizabeth's religion as her nearness to the throne and the circumstances of her birth that endngered her life in Mary's reign. While Mary was poplar Elizabeth was safe; but as son as the Spanish marriage project had tured away English hearts Elizabeth inevitably become the centre of plots and the hope of the plotters. Had not Lady Jane stall been allive to take off the ege of Mary's indignation and suspicion Elizabeth mite have payd forfeit for Wyat's rebellion with her life instead of imprisonment. She may have had interviews with French agents who helped to foment the insurrection; but she was strong and warey enough to avoid Henry II's toils; for even in case of success shes would have been the French king's puppet, placed on teh throne, if at all, merely to kep it warm for Henry's prospective dorter-in-law, Mary Stuart. This did not make Mary Tudor any more frendly, and the Spaniards cried lowd and long for Elizabeth's execution.

She ws sent to the Tower in March 1554, but few Englishmen wer fanatic enuf to want a Tudor beheaded. The great nobles, the Howards, and Gardiner would not hear of such a proposal; and all the efferts of the court throughout Mary's reign failed to induce parliament to listen to the suggestion that Elizabeth should be depived of her legal rite to the succession. After two munths in the Tower she was transfed to Sir Henry Bedingfield's charge at Woodstock, and at Christmas, when the realm had been reconciled to Rome and Mary was expecting isue, Elizabeth was once more received at cort. In the autum of 1555 she went dwn to Hatfield, where she spnt most of the rest of Mary's reign, enjoyng the lessons of Ascham, and panting trees which still survive.

She had only to bide her time while Mary made straight her successor's path by uprooting whatever affection the English people had fr the Catholic faith, Roman jurisdiction and Spanish contol. The Protestant martyrs and Calais between them removed all the altrnatives

to an insular national English policie in church and in state; and no soverein was better qualified to lead such a cause than the queenn who ascended the throne amid universal, and the Spaniards thought indecent, rejoicigs at Mary's death on the 17th of November 1558. "Mere English" she boosted of bein, and after Englishmen's recunt experience there was no surer title to popula favour. No sovereign sicne Harold had been so purely English in blud; her neerest foreign ancestor was Catherine of France, eth widow of Henry V, and no English kling or queen ws more superbly insular in charactar or in policy.

Appendix E: Instructions for group given difficult goal (40 errors or more)

Please note: This group received the same text as above. Their instructions vary on one point only.

In the following passage about Elizabeth I, there are a number of spelling errors. Your task is to correctly identify as many of these as possible by drawing a circle around them with the pens provided. **You do not need to correct the spelling**. None of the names of people or places are miss-spelled. There are no errors in punctuation or sentence structure either. Your aim is to identify and circle **40 errors**. You have **three minutes** in which to do this. You will be instructed when the time is up and you must stop at this point. Don't worry if you do not finish the task in time, you're not expected to.

Appendix F: Personality Questionnaire (NEO-IPIP)

The following pages contain phrases describing people's behaviours. Please use the rating scale next to each phrase to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then circle the response you feel best describes you.

		1	2	3	4	5
		Very Inaccurate	Moderately Inaccurate	Neither Accurate nor Inaccurate	Moderately Accurate	Very Accurate
1	Dislike being the centre of attention.	1	2	3	4	5
2	Complete tasks successfully.	1	2	3	4	5
3	Like to solve complex problems.	1	2	3	4	5
4	Panic easily.	1	2	3	4	5
5	Handle tasks smoothly.	1	2	3	4	5
6	Don't understand things.	1	2	3	4	5
7	Am always prepared.	1	2	3	4	5
8	Know how to cope.	1	2	3	4	5
9	Think highly of myself.	1	2	3	4	5
10	Become overwhelmed by events.	1	2	3	4	5
11	Am not interested in abstract ideas.	1	2	3	4	5
12	Carry out my plans.	1	2	3	4	5
13	Believe that I am better than others.	1	2	3	4	5
14	Turn plans into actions.	1	2	3	4	5
15	Do just enough work to get by.	1	2	3	4	5
16	Am calm even in tense situations.	1	2	3	4	5
17	Need a push to get started.	1	2	3	4	5
18	Do more than what's expected of me.	1	2	3	4	5
19	Excel in what I do.	1	2	3	4	5
20	Dislike talking about myself.	1	2	3	4	5
21	Can handle a lot of information.	1	2	3	4	5
22	Waste my time.	1	2	3	4	5
23	Readily overcome setbacks.	1	2	3	4	5
24	Love to read challenging material.	1	2	3	4	5
25	Don't see the consequences of things.	1	2	3	4	5
26	Start tasks right away.	1	2	3	4	5
27	Am not highly motivated to succeed.	1	2	3	4	5

28	Have a high opinion of myself.	1	2	3	4	5
29	Find it difficult to get down to work.	1	2	3	4	5
30	Work hard.	1	2	3	4	5
31	Have difficulty understanding abstract ideas.	1	2	3	4	5
32	Know the answers to many questions.	1	2	3	4	5
33	Demand quality.	1	2	3	4	5
34	Am sure of my ground.	1	2	3	4	5
35	Can handle complex problems.	1	2	3	4	5
36	Avoid difficult reading material.	1	2	3	4	5
37	Make myself the centre of attention.	1	2	3	4	5
38	Feel that I'm unable to deal with things.	1	2	3	4	5
39	Have little to contribute.	1	2	3	4	5
40	Get to work at once.	1	2	3	4	5
41	Avoid philosophical discussions.	1	2	3	4	5
42	Can't make up my mind.	1	2	3	4	5
43	Plunge into tasks with all my heart.	1	2	3	4	5
44	Postpone decisions.	1	2	3	4	5
45	Enjoy thinking about things.	1	2	3	4	5
46	Put little time and effort into my work.	1	2	3	4	5
47	Consider myself an average person.	1	2	3	4	5
48	Come up with good solutions.	1	2	3	4	5
49	I'm not interested in theoretical discussions.	1	2	3	4	5
50	Go straight for the goal.	1	2	3	4	5
51	Remain calm under pressure.	1	2	3	4	5
52	Misjudge situations.	1	2	3	4	5
53	Get chores done right away.	1	2	3	4	5
54	Boast about my virtues.	1	2	3	4	5
55	Set high standards for myself and others.	1	2	3	4	5
56	Have a rich vocabulary.	1	2	3	4	5
57	Know how to get things done.	1	2	3	4	5
58	Get overwhelmed by emotions.	1	2	3	4	5
59	Seldom toot my own horn.	1	2	3	4	5
60	Have difficulty starting tasks.	1	2	3	4	5

Appendix G: Personality Items and Scales

Below are the items used in the personality questionnaire. They were taken from the NEO-IPIP scales. Each of the six scales has ten items. Those with an 'R' beside them are reverse coded, i.e. 5 = 1, 4 = 2, 2 = 4, 1 = 5. This must be taken into account for data analyses.

Neuroticism - Vulnerability	
Item	# in questionnaire
Panic easily.	4
Become overwhelmed by events.	10
Feel that I'm unable to deal with things.	38
Can't make up my mind.	42
Get overwhelmed by emotions.	58
Remain calm under pressure. R	51
Can handle complex problems. R	35
Know how to cope. R	8
Readily overcome setbacks. R	23
Am calm even in tense situations. R	16

Agreeableness – Modesty	
Item	# in questionnaire
Dislike being the centre of attention.	1
Dislike talking about myself.	20
Consider myself an average person.	47
Seldom toot my own horn.	59
Believe that I am better than others. R	13
Think highly of myself. R	9
Have a high opinion of myself. R	28
Know the answers to many questions. R	32
Boast about my virtues. R	54
Make myself the centre of attention. R	37

Openness – Intellect	
Item	# in questionnaire
Like to solve complex problems.	3
Love to read challenging material.	24
Have a rich vocabulary.	56
Can handle a lot of information.	21
Enjoy thinking about things.	45
Am not interested in abstract ideas. R	11
Avoid philosophical discussions. R	41
Have difficulty understanding abstract ideas. R	31
I'm not interested in theoretical discussions. R	49
Avoid difficult reading material. R	36

Conscientiousness – Self-efficacy	
Item	# in questionnaire
Complete tasks successfully.	2
Excel in what I do.	19
Handle tasks smoothly.	5
Am sure of my ground.	34
Come up with good solutions.	48
Know how to get things done.	57
Misjudge situations. R	52
Don't understand things. R	6
Have little to contribute. R	39
Don't see the consequences of things. R	25

Conscientiousness – Achievement Striving	
Item	# in questionnaire
Go straight for the goal.	50
Work hard.	30
Turn plans into actions.	14
Plunge into tasks with all my heart.	43
Do more than what's expected of me.	18
Set high standards for myself and others.	55
Demand quality.	33
Am not highly motivated to succeed. R	27
Do just enough work to get by. R	15
Put little time and effort into my work. R	46

Conscientiousness – Self-discipline	
Item	# in questionnaire
Get chores done right away.	53
Am always prepared.	7
Start tasks right away.	26
Get to work at once.	40
Carry out my plans.	12
Find it difficult to get down to work. R	29
Waste my time. R	22
Need a push to get started. R	17
Have difficulty starting tasks. R	60
Postpone decisions. R	44